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[REDACTED] 167

27 January 1967

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NRO REVIEW COMPLETED

MEMORANDUM FOR: Chief, Technical Intelligence Division, NPIC

SUBJECT: Background Information on Project HUNGAROUND

REFERENCE: Project 22231-7

1. The exploitation, evaluation, mensuration and in-house reproductions of color missions, particularly Missions [REDACTED] indicated that the processing activity may not be providing optimum reproductions for the extraction of intelligence information. Project HUNGAROUND has been initiated to determine if there is a better "aim point" for color reproductions.

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2. The reproduction of black and white material is relatively simple once the criteria for the density and contrast had been established. Optimum reproductions are provided by manipulating the exposure and processing time. Close liaison between the exploiters and the processing activity, through the TID/SIB, maintain established standards. Evaluations conducted at NPIC determined the "aim point" for black and white reproductions. These evaluations were the selection of the most suitable frame from a variety of reproductions with various levels of density and contrast.

3. The reproduction of color is not as simple. The density and contrast must be controlled in each of the three color emulsions and these emulsions balanced to provide realistic color. In theory this is relatively simple; however, there are four major drawbacks that influence the application of this theory.

Declass Review by NIMA / DoD

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GROUP 1
Excluded from automatic
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The high altitude acquisition material, presently does not record what most people feel is realistic color. The final product would appear too blue to be of practical value. Filters used to absorb the excessive blue light introduce an imbalance in the three emulsions.

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b. The high contrast of the acquisition material is unacceptable for exploitation. This high contrast is introduced by intentional mismatching of emulsions to compensate for average haze attenuation. The excessive contrast is then reduced during reproduction - again at the expense of color latitude (more color hues) and acuity (sharpness).

c. The acquisition material provides wider latitude than any reproduction material available. Consequently, while the reproduction can provide any portion, it cannot provide all the color hues contained in the acquisition material.

d. The acquisition material has better acuity than any reproduction material available. Increased acuity is provided by changing color saturations and contrast; however, again at the expense of realistic color.

e. The problem is that the state-of-the-art of manufacturing material for color duplication seriously lags the state-of-the-art for manufacturing color acquisition material. These constrictions are being eliminated as color technology improves. However, for the present the Community must make the most of what is presently available. Color will be more useful to the Intelligence Community if the color reproductions meet the requirements of those who exploit the material. The processing activity is aware of this need and has requested that an evaluation, similar to the black and white evaluation, be conducted at RPIC to provide an

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"aim point" for the reproduction of color. Informal discussions with [REDACTED] initiated the selection of [REDACTED] to be used to conduct such an evaluation. Twenty-eight reproductions were made of each of these [REDACTED] twenty-one vary in color balance and seven vary in density.

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5. It should be pointed out that this is not a comparison between the merits of black and white and color photography. The purpose of the evaluation is to determine which, if any, color reproduction is optimum for intelligence exploitation, measurement and in-house reproduction. The evaluation may indicate that more than one type reproduction will be required by NPIC. Once the results from this evaluation are studied, the processing activity will be better able to meet the requirements established by the Intelligence Community for the reproduction of color.

6. Assistance will be required of various components of the Center. The evaluation is based on a statistical selection and requires the opinion of personnel who use the material. The primary users of exploitation material consists of TID/SIEB, TID/PB, PSD/PLB and PAC. It is suggested that personnel from all these branches participate in this exercise in the following capacity:

a. TID/SIEB - Six or eight evaluators will participate in the test under the supervision [REDACTED] It will then be SIEB's responsibility to monitor the balance of the exercise and provide an area to conduct the evaluation.

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b. TID/PB - Approximately six targets will be selected by the project officer for measurement to determine if a specific type of reproduction provides more accurate measurements.

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These personnel will not participate in the selection of optimum reproduction portion of the exercise but will be required to take the [redacted] Pseudoisochromatic Color Test.

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c. PSD/PLB - The Photo Lab will be provided with the test material and requested to select the optimum reproduction that satisfies its requirements. Personnel making these selections will also be required to take the pseudoisochromatic color test.

d. PAG - Since exploitation is accomplished by the Photo Analysis Group, it is requested that 20 photo analysts participate in this exercise. It is suggested that the men be divided into five groups. Space and equipment limits the number of participants to four; therefore, the schedule will be as follows:

Group 1	0830-1130 Tuesday and Wednesday
Group 2	1300-1600 Tuesday and Wednesday
Group 3	0830-1130 Thursday and Tuesday*
Group 4	1300-1600 Thursday* and Tuesday*
Group 5	0830-1130 Wednesday* and Thursday*

*Second week of test

It is estimated that 10 to 12 manhours will be required for each participant to complete the evaluation. The PAG portion of the exercise should be completed in six working days. Each working period is limited to three hours to prevent fatigue or boredom from influencing the results. Each participant in the survey will be screened for color blindness, using the [redacted] Pseudoisochromatic Plates Test and Procedures. Color blind persons are encouraged to participate but their score sheets must indicate this fact so their evaluation can be given appropriate weight in the statistical analysis of the data collected.

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7. [] has suggested with the concurrence of [] provide two men for a period of four days to conduct the initial evaluation and indoctrinate the personnel supervising the balance of the exercise. These two men are experienced in conducting such tests and are in a position to answer questions concerning color reproduction. These men will provide equipment for recording the color temperatures of the light sources used in this evaluation. This information is most important for the determination of color reproduction.

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8. The SIEB will provide five [] light tables [] TX tube magnifiers, a secluded area to conduct the exercise, and personnel to monitor and record the results.

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9. [] provided SIEB with the color transparencies, score sheets, procedure instructions, the [] Test Plates and code sheets indicating how each reproduction was made.

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10. The project will be initiated as soon as a convenient time can be coordinated [] The tentative schedule for [] participation is 14-16 February 1967. It is tentatively hoped to commence the RAG portion of the exercise on 03 February. Confirmation of this date will be established at a later date.

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Chief, Systems and Image Evaluation Branch, TID
NPIC

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